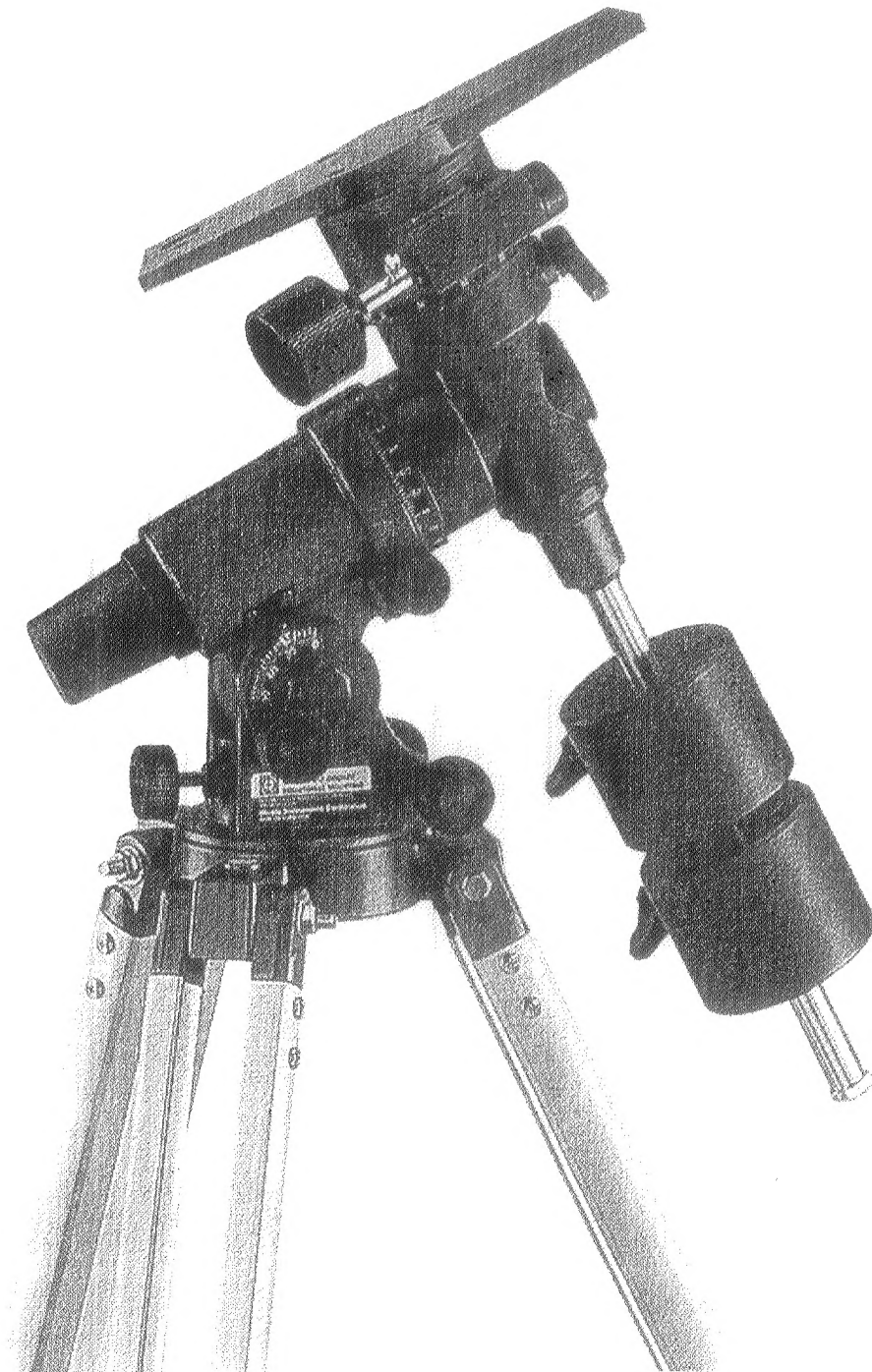


# INSTRUCTION MANUAL

Meade® LXD 500A and LXD 500B Equatorial Mounts



**Meade Instruments Corporation**

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Captions for Fig. 1

1. Saddle Plate
2. Declination (Dec) Slow Motion Control
3. Right Ascension (R.A.) Setting Circle
4. Dust Cover for Optional #812 Polar Alignment Finder
5. Latitude Scale
6. Fine Latitude Adjustment Knob
7. Tripod Legs
8. Tripod Head
9. Fine Azimuth Adjustment Knob
10. Counterweight Lock Screws
11. Declination Axis
12. Counterweight Safety Stop
13. Counterweight Rod
14. 7.5 lb (3.4 kg) Counterweights
15. Latitude Angle (Elevation Angle) of the Polar Aligned Telescope
16. Counterweight Cone
17. Dec Setting Circle
18. Polar Axis
19. Dec Lock Lever

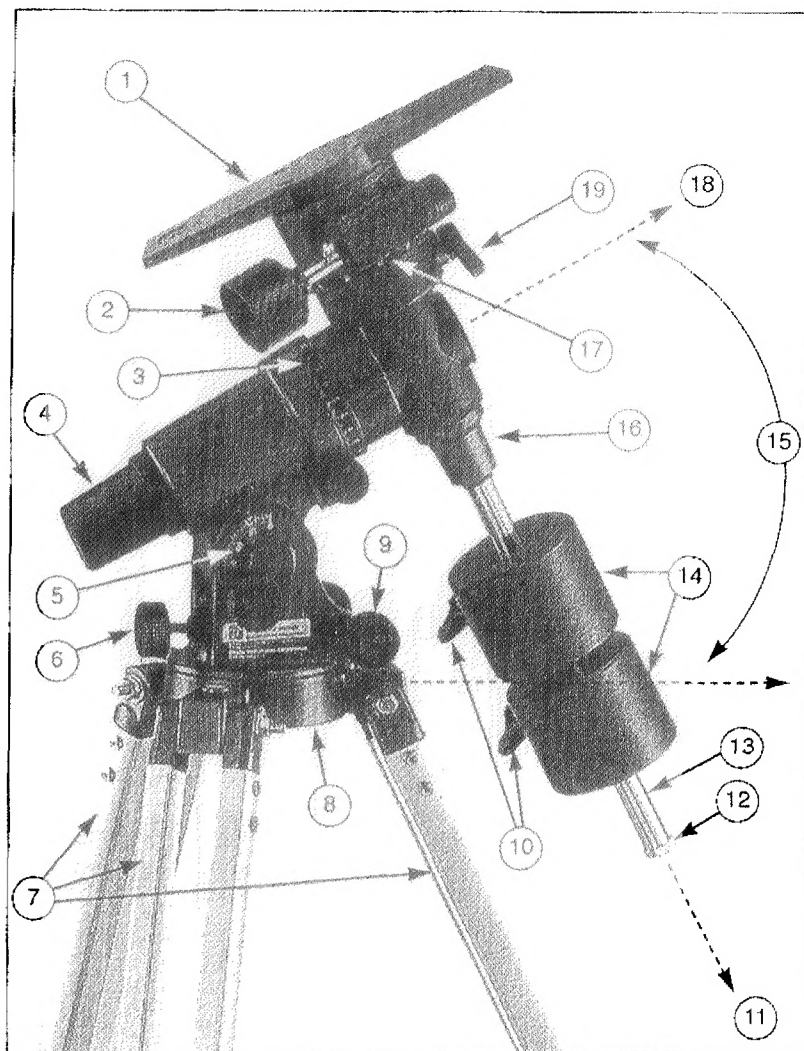


Fig. 1: LXD 500B Equatorial Mount

#### TECHNICAL NOTE

If you have purchased the LXD 500 Equatorial Mount as part of a complete Meade telescope, you should discard this manual. Complete instructions for assembly and operation of the LXD 500 mount are contained within the carton of the telescope's optical tube assembly.

This manual is written for the Meade Model LXD 500A and LXD 500B Equatorial Mounts. With the exception of the composition of the worm gears and the number of counterweights, the two models are identical in design, set up and operation.

**LXD 500A mount:** constructed with aluminum worm gears; one 7.5 lb (3.4 kg) counterweight.

**LXD 500B mount:** constructed with bronze worm gears; two 7.5 lb (3.4 kg) counterweights. Bronze, stronger with less flexure, is the material of choice for equatorial mounts that are required to handle heavier loads.

#### IMPORTANT

**Maximum Load:** Both the LXD 500A and LXD 500B are capable of supporting a maximum load of 30 lb (13.6 kg) including the optical tube assembly, accessories and counterweights. The maximum "payload" weight of the optical tube assembly, including accessories, is therefore 15 lb (6.8 kg). **Application of tube assemblies heavier than this 15 lb (6.8 kg) guideline may result in damage to the mount, voiding of the factory warranty, or both.**

**Attaching Your Tube Assembly to the LXD 500 Mount:** The flat saddle plate that sits atop the LXD 500 mount permits the attachment of a wide variety of refractor, reflector, and catadioptric tube assemblies. The means by which these tube assemblies are attached to the saddle plate are left to the discretion of the user. In all cases, however, be certain that your tube assembly is securely attached to the saddle plate of the mount, and that the maximum payload guideline (above) is not exceeded.

## MODEL LXD 500 EQUATORIAL MOUNT: INTRODUCTION

The Meade Model LXD 500 Equatorial Mount provides observers with an extremely stable, yet lightweight platform for an astronomical telescope. The LXD 500 Equatorial Mount, with its dual-axis worm gear controls, provides smooth, easy to use, tracking capabilities. Also, its variable-height, aluminum tripod collapses for easy transport.

For optimal enjoyment of the Meade Model LXD 500 Equatorial Mount, please take a few minutes to read these instructions thoroughly and become familiar with all of the mount's functions.

## PARTS LISTING AND ASSEMBLY

When opening the packing box for the first time, note carefully the following parts included with the Model LXD 500 Equatorial Mount:

### ■ LXD 500 Equatorial Mount, including:

- Tripod
- Equatorial head
- Lock knob with twist bar (Fig. 3)
- 2 washers (1 large and 1 small washer for lock knob with twist bar)
- Counterweight rod with gray counterweight cone
- 2 pcs. 7.5 lb (3.4 kg) counterweights (LXD 500B)
- 1 pc. 7.5 lb (3.4 kg) counterweight (LXD 500A)
- 2 slow motion control knobs
- Accessory tray

### 1. Preparing the LXD 500 Tripod

The LXD 500 Tripod (Fig. 2) is shipped virtually completely assembled from the factory. Once set up, all that is required of an observer is to attach the accessory tray and adjust the tripod to the desired observing height.

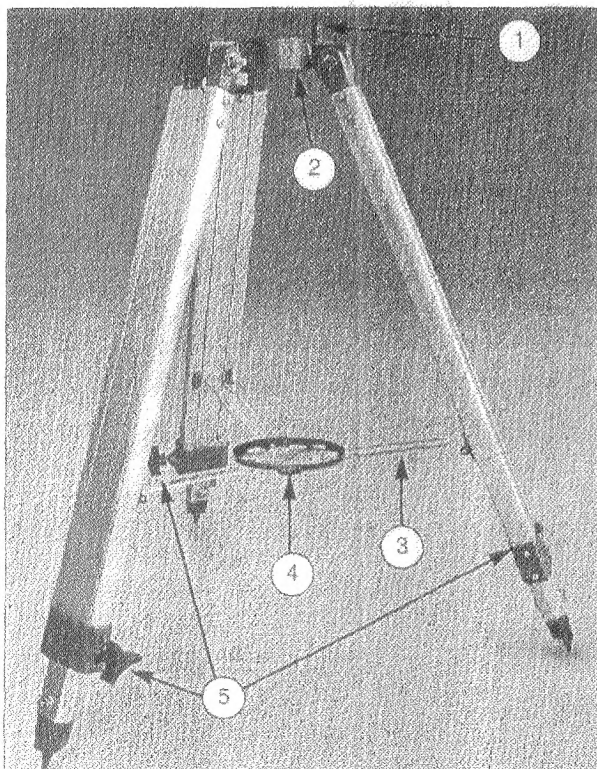


Fig. 2: LXD 500 Tripod. (1) Azimuth Tangent Arm; (2) Tripod Head; (3) Extension Strut; (4) Accessory Tray; (5) Height Adjustment Knob

#### a. Setting Up the Tripod:

Remove the tripod from the shipping box and stand the tripod vertically with the tripod feet down. Grasp two of the tripod legs and with the full weight of the tripod on the third leg, gently pull the legs apart to the fully open position (Fig. 2).

#### b. Attaching the Accessory Tray:

Remove the round accessory tray (4), Fig. 2, from the shipping box.

Unthread the black, star-shaped lock knob from the bottom of the tray.

Place the threaded rod on the underside of the accessory tray through the central hub of the extension strut. Rethread the lock knob onto the accessory tray.

#### c. Varying the Tripod Height:

Loosen the black, star-shaped height adjustment knob (5), Fig. 2, at the base of each tripod leg.

Slide the three inner tripod leg sections out to the desired height.

Firmly tighten (but do not overtighten) the three height adjustment knobs (5), Fig. 2.

#### d. Collapsing the Tripod:

Remove the accessory tray (4), Fig. 2. Grasp the tripod head (2), Fig. 2, with one hand. With the other hand, pull directly up on the central hub of the extension strut, where the accessory tray (4), Fig. 2, was attached. This action will cause the tripod legs to move inward to a collapsed position.

#### Important Notes on the LXD 500 Tripod:

- Remove the accessory tray before attempting to collapse the tripod.
- If the tripod does not extend or collapse easily, do not force the tripod legs in or out. By following the above instructions, the tripod will function properly. Forcing the tripod into an incorrect position may damage the extension strut system.
- Do not overtighten the three star-shaped height adjustment knobs on the tripod legs. "Firm feel" tightening is sufficient.

### 2. Assembly of the Equatorial Mount

To assemble the mount, follow these instructions:

#### a. Attaching the Equatorial Head to the Tripod:

On the Equatorial Head (5), Fig. 3, loosen the two Fine Azimuth Adjustment Knobs (1), Fig. 3, to create a space between the two knobs (as seen from the underside of the Equatorial Head). The Azimuth Tangent Arm (2), Fig. 3, fits between these two threaded knobs.

Unthread and remove the lock knob with twist bar, Fig. 4, and two washers from the base of the Equatorial Head (5), Fig. 3. Place the Equatorial Head on the Tripod Head (4), Fig. 3, aligning it so that the Azimuth Tangent Arm (2), Fig. 3, slips between the two Fine Azimuth Adjustment Knobs (1), Fig. 3.

With the Equatorial Head (5), Fig. 3, sitting flat on the Tripod Head (4), Fig. 3, place the small washer, then the large washer over the threads of the lock knob with twist bar, Fig. 4, and from the underside of the Tripod Head

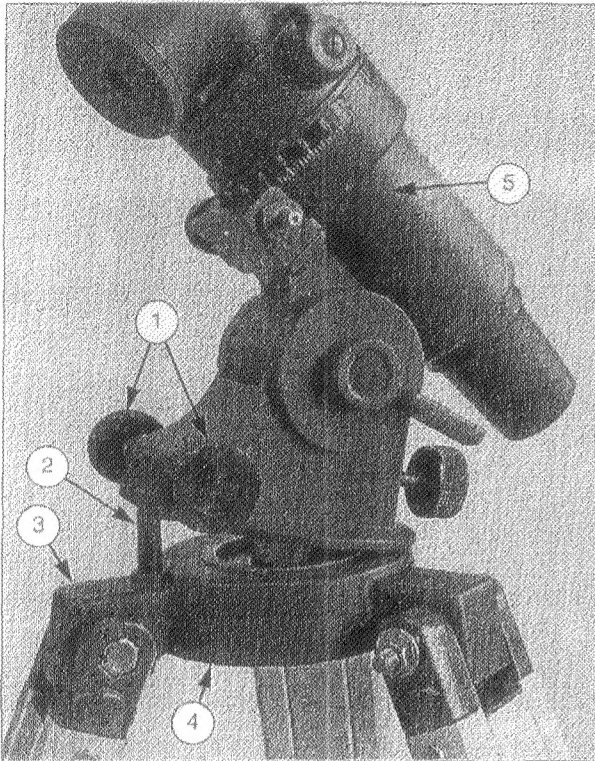


Fig. 3: Attaching the Equatorial Head to Tripod. (1) Fine Azimuth Adjustment Knobs; (2) Azimuth Tangent Arm; (3) North Facing Tripod Leg; (4) Tripod Head; (5) Equatorial Head.

the Tripod Head and into the base of the Equatorial Head. Tighten firmly but do not overtighten.

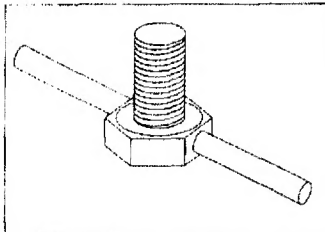


Fig. 4: Lock Knob with Twist Bar.

Simultaneously tighten both of the Fine Azimuth Adjustment Knobs (1), Fig. 3. Each knob will press against the Azimuth Tangent Arm. Do not overtighten.

#### b. Attaching the Counterweights:

On the counterweight rod (3), Fig. 5, confirm that the gray counterweight cone (2), Fig. 5 is threaded onto the rod as far as possible. Then, thread the counterweight rod, with the counterweight cone in place, into the bottom of the declination housing (1), Fig. 5. When the counterweight rod is threaded in as far as possible, additionally secure the rod by turning the gray counterweight cone (2), Fig. 5, clockwise until tight.

At the end of the counterweight rod (3), Fig. 5, unscrew the counterweight safety stop (12), Fig. 1. Slide one counterweight onto the rod and lock in place by tightening its black counterweight lock screw (10), Fig. 1. For the LXD 500B mount, slide the second counterweight into place and tighten its lock screw. When the counterweight(s) is secure, replace the counterweight safety stop. Be certain that the counterweight safety stop is always securely in place.

#### c. Slow Motion Control Knobs:

There are two identical slow motion control knobs. See (4) and (6), Fig. 5. Attach one of these knobs to the R.A. Slow-

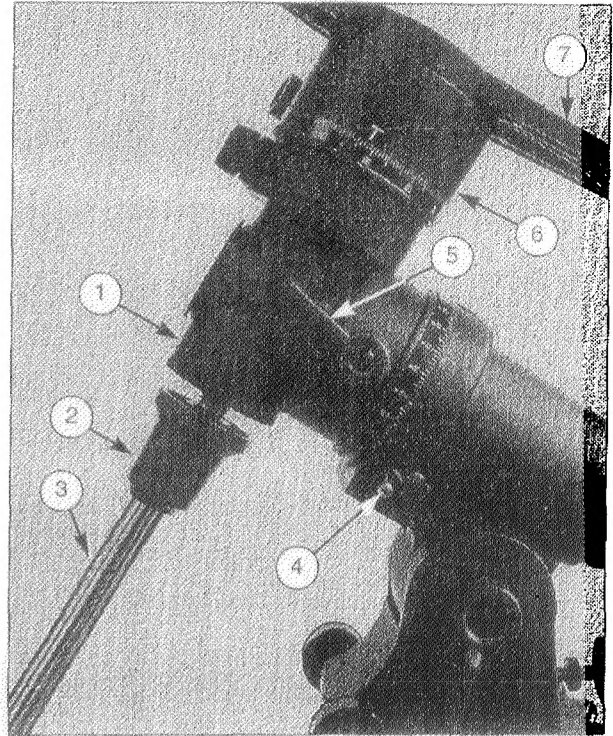


Fig. 5: Installing Counterweight Rod. (1) Declination Housing; (2) Counterweight Cone; (3) Counterweight Rod; (4) R.A. Slow-Motion Control Shaft; (5) R.A. Lock Lever; (6) Dec Slow-Motion Control Shaft (on opposite side); (7) Saddle Plate.

Motion Control Shaft (4), Fig. 5, by aligning the knob so that its knurled thumb screw will slide directly over the flat area on the R.A. Slow-Motion Control Shaft. Tighten the knurled thumb screw to a firm feel. Do not overtighten.

Attach the second knob to the Dec Slow-Motion Control Shaft (6), Fig. 5, by aligning the knob so that its knurled thumb screw will slide directly over the flat area on the Dec Slow-Motion Control Shaft. Tighten the knurled thumb screw to a firm feel. Do not overtighten.

## BALANCING THE TELESCOPE

With your telescope tube assembly mounted on the LXD 500 mount, it is necessary to balance the telescope around both axes. With an improperly balanced telescope, objects may become difficult to find or, once found, may be easily lost. To balance the telescope:

1. Loosen the R.A. lock lever (3), Fig. 6, by rotating the lever counterclockwise until it stops. The Optical Tube Assembly now rotates freely about the Polar Axis (18), Fig. 1. Rotate the telescope so that the counterweight rod is parallel to the ground (horizontal).
2. Loosen the counterweight lock screw(s) (10), Fig. 1, and slide the counterweight(s) along the rod until the telescope remains in one position without tending to drift in either direction. Re-tighten the counterweight lock screw(s) and the R.A. lock lever (3), Fig. 6.
3. Loosen the Dec lock lever (2), Fig. 6, by rotating the lever counterclockwise until it stops. The Optical Tube Assembly now rotates freely about the Declination Axis (11), Fig. 1. Rotate the telescope so that the tube is parallel to the ground (horizontal).
4. Loosen the fixtures\* holding the Optical Tube Assembly in place and move the assembly back and forth until it is



the saddle plate (7), Fig. 5 until the telescope is in balance about the Declination Axis. Rebalancing may be necessary with the addition of any optional accessories. Re-tighten the fixtures holding the optical tube and the Dec lock lever (2), Fig. 6.

*\*These fixtures may be cradle rings, steel straps, or whatever other secure means the user has fabricated to attach the tube assembly to the saddle plate of the mount.*

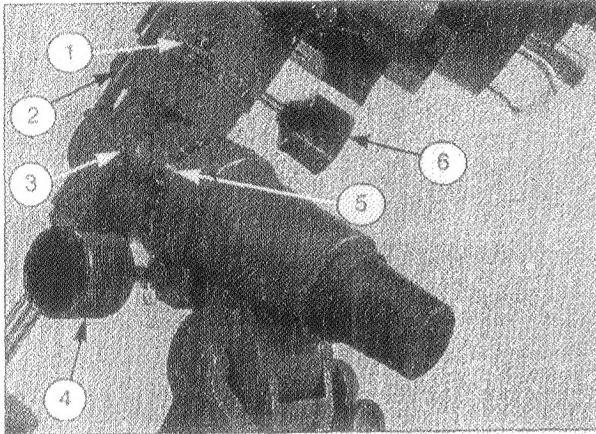


Fig. 6: Telescope Controls. (1) Dec Setting Circle; (2) Dec Lock Lever; (3) R.A. Lock Lever; (4) R.A. Slow-Motion Control; (5) R.A. Setting Circle; (6) Dec Slow-Motion Control.

## MODEL LX D 500 CONTROLS

An important array of controls facilitates operation of the Model LX D 500 Equatorial Mount. It is best to become familiar with all of these controls before attempting observations through your telescope.

**Dec Lock Lever (2), Fig. 6:** Locking and unlocking the Declination movement of the mount is accomplished by moving the Dec lock lever clockwise until it stops for the fully locked position, or by moving the Dec lock lever counterclockwise to the fully unlocked position.

**Dec Slow-Motion Control (6), Fig. 6:** With the Dec lock lever in the fully locked position, the Dec Slow-Motion Control may be used for fine motions of the telescope in Declination.

**R.A. Lock Lever (3), Fig. 6:** Locking and unlocking the Right Ascension movement is accomplished by rotating the R.A. lock lever clockwise until it stops for the fully locked position and counterclockwise for the fully unlocked position.

**R.A. Slow-Motion Control (4), Fig. 6:** With the R.A. lock lever fully locked, the R.A. Slow-Motion Control permits manual slow-motion of the telescope in Right Ascension.

## POLAR ALIGNMENT

Celestial objects are essentially fixed on the Celestial Sphere. However, they appear to move across the sky in an arc as the Earth rotates on its axis, with a complete rotation of the Earth occurring once in every 24 hour period. This apparent motion is not obvious to the unaided eye, but, when viewed through a telescope, this motion is rapid indeed. Objects centered in the telescope move entirely out of the field of view in 15 to 60 seconds depending upon the magnification employed.

During the 24 hour period of the Earth's rotation, stars make one complete revolution about the Celestial Pole, making concentric circles with the Celestial Pole at the center. By lining up the

South Celestial Pole if observing from the Earth's southern hemisphere), **celestial objects may be followed (tracked) by moving the telescope about only one axis, the polar axis.**

In addition, by polar aligning the telescope, the telescope's Dec and R.A. setting circles (1) and (5), Fig. 6, may be used to locate faint celestial objects directly from their catalogued coordinates.

## Polar Alignment Procedures

Polar alignment consists of the following two operations:

1. Pick up the entire telescope-and-tripod and orient the tripod so that the leg directly beneath the counterweight(s) (the leg marked "N") points due north.

For observers in the southern hemisphere (e.g., Australia), pick up the entire telescope-and-tripod and orient the tripod so that the leg directly beneath the counterweight(s) (the leg marked "N") points due south.

2. Determine the latitude of your observing location by checking a road map or atlas. Then, adjust the latitude of the LX D 500 Equatorial Mount to indicate the latitude of your observing location. Turn the fine latitude adjustment knob (3), Fig. 7, clockwise or counterclockwise until the latitude pointer (1), Fig. 7, indicates the correct latitude on the latitude scale (6), Fig. 7.

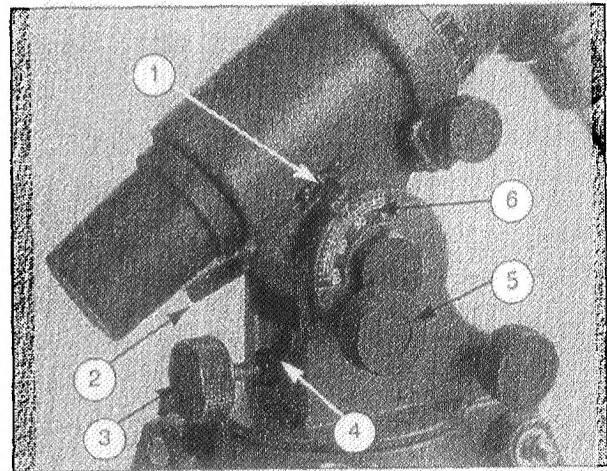


Fig. 7: Latitude Controls. (1) Latitude Pointer; (2) Latitude Lock Lever (opposite side); (3) Fine Latitude Adjustment Knob; (4) Lock Nut; (5) Latitude Lock Knob; (6) Latitude Scale.

It may be necessary to loosen the lock nut (4), Fig. 7, to allow enough movement of the mount to achieve the desired latitude. When the desired latitude has been achieved, tighten the lock nut until the nut is flush against the mount.

Step (1), above, is equivalent to pointing the telescope's polar axis due north (or due south for observers in the southern hemisphere). Step (2) is equivalent to making the telescope's latitude angle equal to the latitude angle of your observing location.

With (1) and (2) accomplished, the telescope is sufficiently well polar aligned for most visual observing applications.

For the majority of telescope applications, this procedure is entirely satisfactory. For those interested in astrophotography or in utilizing the telescope's setting circles to locate faint objects, a more precise polar alignment is necessary, requiring the optional #812 Polar Alignment Finder (see OPTIONAL

**Note:** The Fine Azimuth Adjustment Knobs (9), Fig. 1, are generally only utilized during the precise polar alignment procedure described in the instructions accompanying the #812 Polar Alignment Finder.

Locating North by using Polaris, the North Star, is adequate for the purposes discussed above. Polaris can be found in relation to the Big Dipper by projecting a line from the so-called "pointer stars" of the Big Dipper (see Fig. 8). For southern hemisphere alignment, locate south by using the faint star Sigma Octans (the South Star).

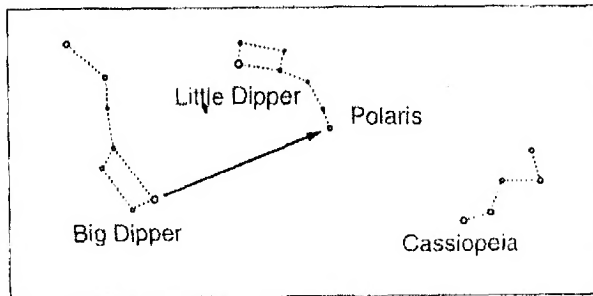


Fig. 8: Locating Polaris.

#### Using a Polar Aligned Telescope

Once the telescope is polar aligned (as described on page 5), the R.A. Slow-Motion Control is the only control needed to keep a celestial object in the field of view of the telescope.

1. To center a celestial object within a polar aligned telescope, unlock the Dec and R.A. lock levers (2) and (3), Fig. 6. Do not move the tripod or adjust the latitude angle when centering an object in the telescope, as this will destroy the polar alignment.
2. Once a celestial object has been centered in the telescope, lock the Dec and R.A. lock levers (2) and (3), Fig. 6. Then, slowly turn the R.A. Slow-Motion Control (4), Fig. 6, while observing through the telescope, to keep the celestial object within the telescope's field of view.

#### Precise Polar Alignment Procedures

For astrophotography or other advanced applications, the optional #812 Polar Alignment Finder can be used to dramatically increase the accuracy of the polar alignment process. As a result, the accuracy of the setting circles increases, making faint objects easier to find. See OPTIONAL ACCESSORIES, below.

#### Setting Circles

Setting circles permit the location of faint celestial objects not easily found by direct visual observation. Locate the Dec setting circle (1), Fig. 6, and the R.A. Setting Circle (5), Fig. 6, on the LXD 500 Equatorial Mount. To use the setting circles, follow this procedure:

1. Using a star atlas or star chart, look up the celestial coordinates (Right Ascension and Declination) of an easy-to-find object, such as a bright star.
2. With the telescope polar aligned, center the chosen bright object in the telescope's field of view.
3. Manually turn the R.A. setting circle (5), Fig. 6, to read the R.A. of the bright object. This setting circle is slightly stiff to turn to prevent accidental movement of the circle when the

circle by placing a hand on either side of the mount. Grasp the setting circle with the thumb and forefinger of each hand and rotate the circle until the R.A. coordinate of the object is correctly indicated by the R.A. pointer on the mount.

4. Manually rotate the Dec Setting Circle (1), Fig. 6, until the Declination coordinate of the object is correctly indicated by the Dec pointer on the mount.
5. The setting circles are now calibrated. To locate a faint object using the setting circles, determine the desired object's celestial coordinates from a star chart or astronomy computer program. Unlock the Dec lock lever (2), Fig. 6, and the R.A. lock lever (3), Fig. 6, and move the telescope in R.A. and Dec until the setting circles read the R.A. and Dec of the desired object. Then, lock the Dec and R.A. lock levers. If this procedure is performed carefully, the faint object will be in the field of view of a low-power eyepiece.

**Note:** Once the Dec circle is accurately calibrated, it need never be touched again, even on subsequent observing sessions. The R.A. circle, however, must be re-calibrated to the R.A. of a known object each time the circles are used to find an object, which might be several times in one observing session.

### OPTIONAL ACCESSORIES

An assortment of professional Meade accessories is available for the Model LXD 500 Equatorial Mount.

#### #812 Polar Alignment Viewfinder

The LXD 500 Equatorial Mount has provision in its polar axis for the addition of the #812 Polar Alignment Viewfinder. This borescope device facilitates quick, precise polar alignment of the telescope. An internal reticle contains an etched clock-like scale. A separate Polar Reference Circle shows the correct position of the North Star on the Finder's reticle scale at any time and day of the year.

#### #1701 Single-Axis Drive System

The addition of the #1701 Single-Axis Drive System allows a polar aligned telescope to track on a desired object automatically, keeping the object in the field of view without manual adjustments in R.A. Add the #1705 Declination Motor to the #1701 for full dual-axis drive capabilities.

#### #1702 Dual-Axis Drive System

Attaching the #1702 Dual-Axis Drive System to the LXD 500 Equatorial Mount provides quartz-controlled sidereal-rate tracking in R.A., plus full dual-axis drive capability at any of four photo-guide or microstep speeds: 2x, 8x, 16x, or 32x.

#### #1705 Declination Motor

The #1701 Single-Axis Drive System becomes a complete, fully functioning dual-axis drive system with the addition of the #1705 Declination Motor.

#### #1708 Computer Drive System

The #1708 Computer Drive System includes live high-torque, dual-axis drive speeds including the fast slewing speed of 4° per second; and locates and centers in the field over 64,300 objects, automatically. Quartz-locked sidereal-rate tracking; GO TO capability; and digital readouts on both telescope axes are just some of the many other features available when the #1708 Computer Drive System is attached to the Model LXD 500

## Meade Customer Service

If you have a question concerning your Meade Model LXD 500 Equatorial Mount, call Meade Instruments/Customer Service Dept. at 714-756-2291, or fax at 714-756-1450. Customer Service hours are 8:30AM - 4:00PM, Pacific Time, Monday through Friday. In the unlikely event that your Model LXD 500 Equatorial Mount requires factory servicing or repairs, write or call the Meade Customer Service Dept. first, before returning the telescope to the factory, giving full particulars as to the nature of the problem, as well as your name, address, and daytime telephone number. The great majority of servicing issues can be resolved by telephone, avoiding return of the telescope to the factory.

## SPECIFICATIONS

### MODEL LXD 500 EQUATORIAL MOUNT

<b>Materials:</b>	
<b>Equatorial Mounting</b>	aluminum castings;
<b>Gears</b>	bronze, R.A. & Dec (LXD 500B) aluminum, R.A. & Dec (LXD 500A)
<b>LXD 500 Tripod</b>	aluminum
<b>Equatorial Mounting</b>	LXD 500; German-type
<b>Tripod</b>	Standard
<b>Tripod Legs</b>	Inner leg: 1.5" (3.8 cm) O.D. Outer leg: double struts; each 1.2" (3.8 cm) O.D.
<b>Tripod Height</b>	28.5" - 48.5" variable (72 cm - 123 cm)
<b>Counterweights</b>	2 X 7.5 lb. (3.4 kg.) (LXD 500B) 1 X 7.5 lb (3.4 kg) (LXD 500A)
<b>Worm Gear Diameters</b>	2.91" (7.39 cm)
<b>Setting Circle Diameters</b>	R.A. & Dec: 3.4" (8.6 cm)
<b>Manual Slow-Motion Controls</b>	R.A. and Dec
<b>Latitude Range</b>	15° - 70°
<b>Total Net Weight (approx.)</b>	34.5 lb (15.7 kg)
<b>Total Shipping Weight (approx.)</b>	37 lb (16.8 kg)



## MEADE LIMITED WARRANTY

Every Meade telescope, spotting scope, and telescope accessory is warranted by Meade Instruments Corporation ("Meade") to be free of defects in materials and workmanship for a period of ONE YEAR from the date of original purchase in the U.S.A. and Canada. Meade will repair or replace a product, or part thereof, found by Meade to be defective, provided the defective part is returned to Meade, freight-prepaid, with proof of purchase. This warranty applies to the original purchaser only and is non-transferable. Meade products purchased outside North America are not included in this warranty, but are covered under separate warranties issued by Meade international distributors.

**RGA Number Required:** Prior to the return of any product or part, a Return Goods Authorization (RGA) number must be obtained from Meade by writing, or by calling (714) 756-2291. Each returned part or product must include a written statement detailing the nature of the claimed defect, as well as the owner's name, address, and phone number.

This warranty is not valid in cases where the product has been abused or mishandled, where unauthorized repairs have been attempted or performed, or where depreciation of the product is due to normal wear-and-tear. Meade specifically disclaims special, indirect, or consequential damages or lost profit which may result from a breach of this warranty. Any implied warranties which can not be disclaimed are hereby limited to a term of one year from the date of original retail purchase.

This warranty gives you specific rights. You may have other rights which vary from state to state.

Meade reserves the right to change product specifications or to discontinue products without notice.

This warranty supersedes all previous Meade product warranties.

